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THE ASSOCIATIONAL CONCEPTION OF EXPERIENCE.

THE theory of a philosophical school is a matter of development. It is not determined by the tenets of any philosopher in particular, or by the average belief of the school, but by the direction in which the standpoint represented by the school tends on the whole to develop. It is what the school is trying to express rather than what it actually succeeds in uttering. It may, therefore, be more truly represented by the latest disciple than by the founder himself. But the theory of a philosophical school is also determined by that of the opposite school. Its development takes place not alone, but always coördinately with that of its antithesis. The interaction between the two schools resembles that between two contestants in a game of chess. Each is developing his own game, but at the same time modifying it to meet the moves of his antagonist. Thus it happens that the associational school has been successively opposed to the theory of innate ideas, to the theory of *a priori* forms of thought, and now to the theory of apperception. These three theories represent in themselves a consistent line of development. The latest of them, the theory of apperception, under which I include not merely the Wundtian formulation, but the general tendency represented by James, and most distinctively by Stout, is the outcome of the recently discovered factor of 'attention.' It seems to me that this move of the apperceptionists has not yet been fully met by the associational writers; and that the bearing of the factor of attention upon the formulation of associational theory has still to be satisfactorily emphasized. The attempt to do this will constitute my excuse for the present paper. I shall try to show (1) that the theory of association is a purely physiological theory (which perhaps is not extensively disputed), but more particularly (2) that it can no longer be called the 'experience theory' in any but a peculiar and restricted use of the term 'experience.'

It will be clearer, though more tedious, to begin with first princi-

ples. The problem which the associational theory aims to solve, has probably never been better or more compactly expressed than in Kant's question : How are *a priori* judgments possible? How can an astronomer correctly predict the date of an eclipse? How does he come to know anything more than the particular details of his past experience? In such a case the plain man is likely to answer : 'By the exercise of his reason.' This is substantially the answer of the apperceptionists (using this term to include all the opponents of associationism), who have accounted for the possibility of *a priori* judgments by reference to innate ideas, to *a priori* forms of thought, and now to subjective mental activity. The associationist refers it always to experience. Elements that have coexisted tend to cohere (Bradley). Relations once set up tend to persist (Titchener). Associationists differ among themselves as to the nature of those relations, and hence as to the laws governing the formation of mental compounds, also as to the definition of the elements. It seems safe to assert, however, that the law or laws of association, however described, are universally intended to represent the tendencies inherent in the elements themselves, without reference to any additional activity on the part of the minds in which they are contained, these minds being regarded merely as compounds formed by the action of the laws inherent in the elements.¹ What a particular element of experience will in a given case call up, is, of course, conditioned by contact with the compounds already formed, that is, with the mental organization due to the former experience of the individual and his ancestors, just as the motions of satellites are conditioned by the presence of the planets ; but, just as comets and satellites are both formed of similar elements, governed by the same law, so are hereditary mental structure and acquired experience governed by the one law controlling the action of mental elements. The laws of association stand in the same relation to the elements of experience as the laws of physics to its atoms, or the laws of chemistry to its elements. The result depends

¹Titchener, if he is to be called an associationist, would probably not be represented by this statement, but he is certainly opposed to the conception of a mental activity operating upon the elements *ab extra*.

wholly upon the original relation of the data. The relations in experience are repeated by the relations in thought.

The fundamental assumption, then, of all associational theory is the conception of a fixed order of experience. This is the ultimate and indisputable fact upon which the formulation of the theory is based. Its whole meaning rests, therefore, upon the interpretation to be given to the term 'experience.' What modification does this term undergo in the light of recent psychological development? This is the question that will occupy us here. We shall approach the question through a comparison of the associational and apperceptual theories as applied to the conceptions of space and cause.

Let us confine our attention, in the examination of the space-conception, to the question of the third dimension, and assuming that no explanation is required as to why things are seen outside of each other, that is, side by side, let us ask how one comes to infer a front and back from data that appear merely side by side. The associationist explains the third dimension by reference to concomitant variations between the data. For example, as an object recedes it (1) grows smaller, and (2) becomes less distinct in outline and color. This is accompanied by (3) greater accommodation of the lens, and (4) less convergence. These are merely some of the more important optical elements, and to them must be added (5) the extent and direction of movement necessary (6) to touch the receding object. Now, according to the associationist, a given complex of optical conditions has been observed to accompany a given tactile-motor complex. A specific value of the one corresponds to a specific value of the other. The third dimension is due, then, to a practical infinitude of observed correspondences between the two scales.

With regard to the cause-conception, the associationist undertakes to explain how we derive the conception of invariable and necessary succession from mere succession, a *propter hoc* from a mere *post hoc*. The general answer is simple: the law of cause copies the relations observed in experience. Iron sinks, wood floats, fire burns, etc. The frequency and the invariability of these observed successions have produced the conception of

invariable and necessary relations. But, of course, all causal sequences are not of this invariable and obvious kind. The cause sometimes antedates the effect by a long period, as in the case of seed and plant. Nor are all invariable sequences directly causal, since, *e. g.*, the lightning is not ordinarily regarded as the cause of the thunder; and we tend to regard certain sequences as essentially causal while rejecting others as irrelevant, *e. g.*, the succession of colors in the ripening of fruit. If the striking of the clock is followed by a noise on the street, and this in turn by the sudden appearance of bright sunlight, the events though successive are not related causally. How then do we come to differentiate the distinctly causal sequence? The associationist refers still to the invariability observed in experience. But it is the invariability observed in a broader view. A city-bred child might readily believe that the florist makes the flowers he sells, but wider experience shows him that flowers invariably come from seeds planted in the ground. Greater breadth of experience tends therefore to bring out for each sense-impression its appropriate and invariable antecedent and consequent; and the cumulative effect of experience as a whole is to bring about the habit of thought which expresses itself in the belief in the necessity of the causal sequence.

So much for a statement of the associational position. Can we now discover in experience the fixed order which the theory demands? Recurring first to the space-elements, if we limit our enumeration of elements to those consistent with a space-order, it is of course obvious, because tautologous, that the space-order merely repeats the order of experience. But there are other conditions to be taken into account, among which the following are prominent examples. (1) The space of experience is not a broad expanse of clear vision, since only those points are clearly seen for which the eye is directly accommodated. (2) Nor are the several colors seen with equal distinctness in all parts of the field, since the peripheral portions of the retina are relatively insensible to differences of hue. (3) Nor do all the hues from approximately the same point in a plane appear with equal distinctness, since the different hues are differently refracted by the media of the eye.

(4) Nor do I, after removing my eyes from an object, cease to see it, since the image still exists in complementary colors. (5) Nor does the blind-spot admit of experience of completely filled space. (6) And, finally, I may mention the numerous small objects within the eye whose shadows, cast upon the retina, appear when one looks at a clear sky. This list might be extended. If we add these elements to those commonly included in space-experience, the last semblance of order is destroyed. The space-order is now like the angel which Michael Angelo saw in the block of marble. If not isolated from contiguous elements, it does not exist. *There is no order in space-experience except as we ignore the disorderly elements.*

There may be some objection to including the additions made here to the space-elements under the head of 'experience.' It may be pointed out that they form no part of the experience of the ordinary man, and first appear only after some training in experimental psychology or optics. In this respect, however, they do not differ from the elements of space-experience commonly recognized. Bain¹ tells us that we observe the object to grow smaller as it recedes, that we notice the correspondence in the images of the two eyes as well as the fact and direction of convergence. But surely no one whose mind is still unbiased by the study of physiological optics ever, under ordinary circumstances, sees a man grow smaller as he walks away. The sides of the streets do not ordinarily converge in the distance. Nor are we ordinarily aware of the difference of the images in the two eyes. We may be to some extent conscious of the movements of the eyes, but certainly not with sufficient accuracy to use them for purposes of measurement; for it is supposed to be the absence of such knowledge which produces the after-images of motion. Any of these elements may, however, be perceived under unusual conditions. Men may look like pygmies when seen from a high tower, parallel lines converge when we watch the tracks from the rear of a moving train. But so incapable is the plain man under ordinary conditions of determining the size of the visual angle, that to represent it on paper, that is, to draw the object in perspective,

¹ *Senses and Intellect*, p. 368.

he needs a course of special training. The orderly and disorderly elements of space-experience are therefore alike ; neither kind is ordinarily a part of experience, but both will appear under proper conditions of training and practice.

A similar argument applies to the conception of cause. Upon closer inspection of experience we do not find the invariable sequences upon which the associationist's argument rests. Take, for example, the law of falling bodies. According to this law a body, free to fall, falls at a fixed rate of acceleration in a line perpendicular to the ground. But, to begin with, not all bodies fall that are free to fall. Nor when they do fall do they necessarily or even generally fall in a line perpendicular to the ground. This depends upon the nature of the ground, the force of the wind, and a number of other circumstances. As for the rate of fall, apart from the variations occurring at different parts of the earth, it varies with the density of the body, and of the medium, and, again, with the form of the body, and the distribution of weight in the parts. Now, since bodies that fall in nature are of all varieties of forms and densities, and fall under every variety of conditions, the facts observed are far from showing any uniformity of behavior. What we mean then by the law of falling bodies is, not that they actually do fall in the direction and at the rate indicated, but that they *tend* thus to fall, that is, that they obey the law if nothing interferes. The causal order is therefore, like the space-order, *invariable only when we cut out the variable factors*.

The objection will be made that the approximate invariability in experience of the action of falling bodies can be easily shown by simple laboratory experiments. And this brings to light a conception that often passes for that of 'experience.' When a plain man declares that the presence of law in nature is a fact of experience, what he usually has in mind is not nature as such, but nature modified by the work of man. He thinks perhaps of an electric bell and of the invariable ring after the button is pressed ; or of a steam engine and of the relative accuracy with which one can compute the amount of coal necessary for a given amount of steam-power. Such phenomena, however, are no longer pure

experience, but experience modified by human thought, that is, by the factor which the experience-theory sets out to explain. The action of the electric bell is indeed relatively invariable, but only because, by the use of copper wire, carefully insulated, of cells containing the proper elements separated and insulated from surrounding objects by glass, of carefully polished connections, etc., we have isolated all the factors which would interfere with the invariable result that we aim to produce. And so, too, of the steam engine; every part is carefully constructed to get all the power possible out of the coal burned. This is true, again, of the laboratory experiment, *e. g.*, of falling bodies. Experience gives us invariable results because we have carefully excluded the variable factors. The falling of a steel ball in the laboratory is very different from, say, the falling of a leaf. The latter may be caught up by the wind and carried out of our sight. Impartial observation of nature furnishes us with few invariable sequences. The alternation of heat and cold, of fair and stormy weather, the peculiarities of climate, and the distribution of fauna and flora, cannot be determined with certainty from previously observed conditions.

The further objection may be made that the more scientific and accurate expression of the causal principle does not require specific facts always to be followed by certain others, but merely that each fact maintain a constant value in the system of which it forms a part, so that any change in the element in question shall be accompanied by a corresponding change in the rest of the system as a whole. This is expressed by the physicist in the law of the conservation of energy. To fix its meaning for ourselves, let us suppose that the speed of a railway train varies only with the power of the locomotive and the weight of the train. The three elements, speed, power, and weight, constitute a system in which the parts are so balanced that a change in one involves a change in the sum—or product—of the other two. Each of the elements may change, while one, but not both, of the others remain the same. We have here then a fixed system of relations without, however, any specific sequences of facts. Now, according to the association-theory, the conception of a balanced sys-

tem, or of an invariable quantity of energy, is the result of experience, which never shows a change in one factor of a system without a corresponding change in the rest of the system as a whole. But, again, the claim appears invalid upon closer inspection. It is obviously impossible to derive the conservation-law from the mere observation of nature. If it is anywhere a fact of experience it must be in the laboratory where the system within which the energy is to remain constant can be relatively isolated. But no system of things can be completely isolated. The best bit of physical apparatus ever constructed will not be free from disturbances arising from external conditions. The example of the railway train just given is an abstraction from actual conditions. The speed of the actual train varies not merely with the conditions given, but with grade, direction and force of wind, temperature, atmospheric pressure, and countless other details. If we are fully to account for its behavior we must consult the actions of the most distant planet. The system within which the quantity of energy remains the same, includes, therefore, nothing short of the universe as a whole. But this is what the law of conservation really means—not that the quantity of energy remains the same in any relatively isolated system of phenomena, like that constituted by the steam engine, but that it remains constant in the universe as a whole. And, in this case, it obviously cannot be a formulation of observed experience. The quantity of energy is never *observed* to remain constant. There is always some discrepancy between antecedent and consequent; and constancy cannot be affirmed of anything in experience *except as we construct sufficient hypothetical experience to account for the discrepancy.*

This brings us to a statement of the apperception-theory. This theory declares: (1) that knowledge begins with a tendency to view the world as a harmonious system, and (2) that it is the operation of this tendency which brings out the differences called 'sensation-elements.'

(1) The apperceptionist reverses the associational order of things. For the associationist the simple mental fact, that which furnishes the clew to the analysis of mental life, is the chance

conjunction of two otherwise unrelated elements, and nothing is more complex, or more likely to mislead, than an act of deliberate reasoning. It is this process, however, which the apperceptionist regards as simple and typical. We may, therefore, conveniently approach our statement of the theory with the examination of a case of reasoning. I quote the following from Jevons :¹

“Newton, having passed a ray of sunlight through a glass prism found that it was spread out into a series of colours resembling those of a rainbow. He adopted the theory that white light was actually composed of a mixture of different coloured lights, which became separated in passing through a prism. He saw that if this were true, and he were to pass an isolated ray of the spectrum, for instance, the yellow ray, through the second prism, it ought not to be again broken up into different colours, but should remain yellow whatever was afterwards done with it. On trial he found this to be the case, and afterwards devised a succession of similar confirmatory experiments which verified his theory beyond all possible doubt.”

This is offered by Jevons as an illustration of his thesis that reasoning begins with a survey of the facts, though it afterwards involves the use of hypothesis. Jevons implies that Newton adopted the theory of dispersion *because* he had first observed the prismatic colors. But what led Newton first to pass the light through the prism, or why did he attach any importance to the display of colors? More generally, why was so simple a fact discovered so late in the history of the race? This might be asked about every scientific discovery, for every law is after all simple when once fully understood. Evidently the difficulty is not with the immediate facts. Newton was not the first to notice the fact of the prismatic colors. Nature herself offers numerous cases from which the law of dispersion might be easily derived. Descartes, for one, had already observed the facts and nearly reached the correct explanation; but, according to Whewell, he was misled by a false hypothesis. And herein lies the point of the apperceptional theory. Knowledge depends not merely upon the facts presented, but upon the point of view from which they are ob-

¹ *Lessons in Logic*, p. 259.

served. The reception of the facts is itself determined by the point of view. If Newton took the trouble to procure a prism, or even negligently to observe the facts, it was because he had already formed a hypothesis of some sort which he wished to verify. This was clearly the case in the second experiment, where he passed the yellow ray through a second prism ; for here he had the definite expectation that the light would not again be broken up into different colors. And certainly he had an end in view when "he devised a succession of similar experiments." Now, according to the apperception-theory, what was true of the later experiments was true of the first. Reasoning begins with a theory—not necessarily with an elaborated theory, but, at least with the expectation of discovering some things rather than others. The theory becomes then a trial-hypothesis, or a question put to experience ; and experience furnishes the facts because we have first asked the question.

From reasoning to sense-perception is a passage from a relatively experimental to a relatively established hypothesis. The distinction is purely relative ; and this corresponds to the common observation that what is reached by one person through a process of reasoning is with another a matter of immediate perception. When Newton judged that white light was decomposed by the prism, his judgment lacked complete conviction ; for he made further experiments by way of confirmation. What he meant was : ' If the coloured rays are elements of white light, any one of them may be passed through another prism without being decomposed.' And if, by way of supposition, the yellow rays had been similarly decomposed, he would doubtless have been puzzled, but not seriously alarmed. This is quite different from the attitude of the person who says : ' I see my keys upon the table.' He is expressing not a mere hypothesis regarding the connection of seeing and grasping, but a firm conviction—a conviction so firm that, if he should put out his hand and touch nothing at the spot where he sees the keys, the shock might even result in serious mental disorder. Now, according to the apperception-theory, there are some hypotheses which are still on trial, and others that have become settled points of view in the race.

The space and cause conceptions are among the latter. They constitute for the individual an *a priori* standpoint from which the process of sense-perception takes place. They are presupposed not merely in the deliberative reasoning of mature persons, but to some degree in the earliest mental activity of the infant.

The principle of apperception may be summed up in an expression of Professor James (though I am not sure how far he would care to be called an 'apperceptionist') that it is the fashion of the mind "to unify all data which it is in any way possible to unify." The fundamental presupposition of all knowledge is that the universe is a harmonious system. The character of the system presupposed, which does not immediately concern us here, determines our distinction of real and unreal, fact and fiction. We rarely attempt to unify the data in one act of thought. This is left for our more metaphysical moments. Ordinarily we take the world piece-meal, and make use of different preconceptions, like different pigeon-holes—"apperception-systems," as Stout calls them—for different data. These various apperception-systems are in practice more or less divergent and unrelated. It is far from being a sign of mental weakness that a man should regard a given fact as the expression of a Divine Providence, and, at the same time, as the inevitable outcome of mechanical forces, even though the two conceptions seem to him immediately contradictory; for he may still cherish the belief, as many do, that they are ultimately reconcilable. If, however, he be firmly convinced that they are irreconcilable, he will reject the one while retaining the other. For the basis of all his knowledge is the conviction that only a harmonious system of things can be ultimately real.

(2) Turning now more particularly to the elements of experience, the theory of apperception claims that, so far from being the original data in the mental process, they are the later products of the preconceptions by which the process is guided. Experience exists because we look for it. It is what it is because it is what we are prepared to receive. That this is the fact in many cases of common experience, no one will deny. The captain of an inward-bound steamship sees land before any

of his passengers, because he knows where to look and what to see, while the passenger may search in vain until the peculiarity of the shore is described to him. This is particularly true of sounds and odors. 'Do you hear anything or smell anything?' may receive a negative answer, when 'Do you hear footsteps?' or 'Do you smell gas?' receives confident affirmation. I know at once when my name has been uttered in conversation about me though I have failed to distinguish anything else. The same is true when one hears one's native language in a foreign city. It is a familiar fact in the laboratory that a student must be taught what to see, *e. g.*, in a microscope, before his results are of any value; and even trained observers are not always to be trusted to see what is there if they have prejudices of their own.

This is also true, as I have already hinted, in the case of scientific experiment. We make an experiment because nature of herself refuses to work out our theory. The facts that ought to confirm the theory are complicated with disturbing conditions, which it is the object of the experiment to exclude; and its confirmatory value depends upon the success of the exclusion. The preconceptions according to which the exclusion is effected are expressed in the nature of the apparatus. The subsequent phenomena are then the 'results' of the experiment, because they are the only ones which the preconceptions of the experimenter allow us to regard as such.

Scientific observation, as Jevons points out, differs from scientific experiment only in degree. In observation we wait until nature offers us the proper conditions, instead of attempting to secure them by force. And, again, our facts are such only as we think we ought to receive as such. Thus the planet Uranus was discovered only after an elaborate calculation had determined where it ought to be seen. The weight of the atmosphere was finally demonstrated because Pascal had a barometer carried to the top of a mountain. In both cases the experienced facts were the outcome of preconceived theory. And the same is true of modern discoveries in disease-germs. The germs have been discovered in most cases as the result of investigations stimulated by the formulation of the theory. The theory may

not be the only factor in producing the facts, but without some form of theory they would not have been discovered.

Now the apperception-theory teaches that what is true of active attention (so-called), and the deliberative processes of science, is true also of the ordinary processes of sense-perception. We may illustrate again by reference to space and cause. Our usual space-experience consists simply of that which the space-preconception renders intelligible. We do not, for example, observe that an object grows smaller and fainter when receding, or that we get a different image with each eye. What we see is one object remaining always of the same size. Whatever the physiological conditions may yield, is modified to conform to this conception ; and whatever is irrelevant or opposed to it does not come to consciousness at all. Thus it happens that the consistency of space-perception remains undisturbed by after-images, entoptic appearances, irregularities of the retina, chromatic aberration and the like, which are so completely excluded that only a considerable effort will enable one to see them at all. The preconception may operate to the extent of falsifying the data, as in the case of the pseudoscope, where the only objects whose relief is reversed are those in which the reverse relief is conceivable. A human face, Professor James tells us, cannot possibly be seen as hollow.

The cause-conception operates in a similar manner, and carries on a selective function, not only as a category of science, but as a condition of sense-perception. If I add together all the possibilities of experience within my reach, including all the objects that touch the outside of my body, and the possible feelings from inside, also all the sounds, odors, and sights that are at any one moment within my field of experience, and then remember that a similar complexity occurs at every moment of my life, the result is a bewildering confusion, making a consistent train of ideas at first sight inconceivable. That a consistent train of ideas exists is due, according to the apperception-theory, to the presupposition of cause which keeps out of consciousness all that tends to introduce disorder. We reduce our experience to the conceivable, and the conceivable is the order of cause and effect. When,

for example, I hear footsteps outside my door, I know what may conceivably follow—a knock at the door, let us say. But so far as mere external conditions are concerned, almost anything may follow—the noise, say, of a distant street car. That I hear the tap on the door, however faint, and ignore everything else is due to the operation of the conception of cause. Except for this, any object might be followed by any other, and a consistent train of experience would be impossible. It is this that enables the physician to detect symptoms which are imperceptible to the anxious relatives. No better illustration can be found than the attitude of the popular mind toward the colors which a modern painter introduces into his landscapes. For the ‘plain man,’ colored shadows are fantastic and absurd. He claims that nothing of the kind is found in nature—and rightly so, for according to his conception of the causal relations of lights and shadows a colored shadow is impossible. But when he has once admitted the opposite as a possible hypothesis, he finds it immediately confirmed by the discovery of the fact.

I have dwelt thus long and tediously upon the theory of apperception, because I wish to emphasize the thesis, that the final result of the apperception-theory is to dispose completely of the associational ‘order of experience’ in the usual sense of that term. The theory of apperception teaches not merely that an order, at first passively received, is interpreted, or re-interpreted, according to our preconceptions; nor merely that the preconceptions are necessary and useful instruments for the discovery of an absolute order, but that they determine from the outset in sense-perception what is to constitute experience. In some manner the irrelevant elements are discouraged from entering before they even show their faces at the door; and the preconceptions thus reign supreme, dictating not merely what the facts shall *mean*, but also what they shall *be*.

Now I assume that associationists would on the whole agree with the statement of facts here given, though, of course, their own statement would be made in different terms. In place of preconceptions as determining factors in attention, they would speak of “groups of latent ideas” (Ziehen); and since these groups

are themselves the associative result of earlier experience, they would still hold the position that the mental life is the outcome of experience and of nothing but experience. The development of the cause-conception begins, for example, with the perception of the more immediate and obvious causal connections. These tend by their frequency to beget the habit of looking for causal connections, which results in the discovery of those cases where cause and effect are not in immediate succession. In this sense the associationist admits the fact of attention and choice, the choice being ultimately determined by experience itself.

Assuming, then, that the associational theory admits the fact of selection, we may go on to inquire in what sense it can still hold that the original material of consciousness consists of elements of experience. In answering this question it is important to note that the associationist's 'experience' must include the rejected as well as the chosen elements ; for it is to unselected experience, acting according to laws of its own without interference from any external principle that he attributes the development of consciousness, and of selective attention itself. What then has happened to the rejected elements ? Where did they really exist ? Not, of course, in the consciousness to which we attend, since this is excluded by the admission of selection. Possibly, we might say, in 'unconscious' or 'subliminal' consciousness. But this answer is hardly to be expected from an associationist, since no school has been more emphatic in rejecting 'metaphysical' hypotheses of this kind—and in any case the change of *venue* would not dispose of the problem. For of what happens 'below the threshold' we can judge only by what happens above ; and if an independent principle of selection or apperception determines the conscious life above the threshold, it may just as well do the same below.

I hold then that the only definition which a consistent associationist can give to the term 'experience' is that of 'sense-stimuli.' When he claims that knowledge is the result of experience, unmodified by any other factor, he means that it is the result of neural processes set in action by physical forces acting upon the end-organs of sense ; and it is the sum-total of these forces that is represented by the mental development. They may or

may not be accompanied by consciousness. The concomitant consciousness has in any case nothing to do with the process. The sequence causally operative is the sequence of events initiated in the end-organs. It is there, and there only, that the associationist can find a fixed *order* of experience. Introspective analysis yields no order, since it can never be extended far enough to include all the elements. But the mechanical principle guarantees the brain to be an infallible registering apparatus. Every vibration of any kind or extent, great or small, which reaches an end-organ, must, by the very conception of natural law, have its effect upon the brain, just as every drop of water has its effect upon the hardest rock. It matters not whether the stimulus be above or below the threshold of attention. It matters not whither the attention be directed at the time, since this cannot prevent a sense-stimulus from reaching the eye, or from being registered in the condition of the nervous system as a whole. Every impact upon an end-organ has its specific effect. Its effect may be negated by a stimulus of another order or greater frequency, but, in any case, the condition of the brain is different from what it would be had the impact not occurred. Granting, then, that the brain is the outcome of none but mechanical laws, and acts according to none but mechanical laws, the nervous development on the whole must represent the algebraic sum-total of sense-stimuli.

An excellent illustration of the tendency implied in associational theory is found in the contrast of Mill's and Spencer's views of the development of moral impulses. So long as Hedonism maintained that the moral impulses were the outcome of a *calculation* of pleasures and pains, it was open to the objection that the conditions were too complex to be ever capable of calculation. But the case is different when they are referred, as by Spencer, to the mere dead weight of outer relations. Granting that every pleasant or unpleasant stimulus has had its appropriate effect upon the nervous system, the brain must represent a summation of results far more accurate than that of reasoned calculation. It is similar in the case of space and cause. The number of possible optical complexes, on the one hand, and of tactile-motor

complexes, on the other, is in each case practically infinite. How, then, could the primitive mind succeed in relating the two scales whose relation the scientist of to-day finds so difficult to explain? The associationist answers this by reference to the ages occupied in the process of evolution. And no doubt this explanation would be sufficient if we could understand whence the first clew to the relation of the two scales had originated. The difficulty can be more easily stated in reference to the cause-conception. If experience were in the form of a single element *a* followed by a single element *b*, if, to use a concrete illustration, all of consciousness at any given moment consisted of a white crystalline loaf, followed at the next moment by nothing but a sweet taste, it is easy to see how the white loaf would be associated with a sweet taste, and how the association would be strengthened by frequency. But since the number of elements at each moment is countless, we have to explain how the primitive man discovered, to begin with, that the appropriate consequent of *a* was *b*. It is a case of a needle in one haystack to be associated with a thread in another, and this by an agent not primarily aware of the existence of either. Repetition of experience fails to remove the difficulty, for a connection of terms which was not recognized at the time could not be remembered afterward; and, unless the connection had been remembered, our primitive man—or animal—would be no further advanced after a thousand instances than after one. It seems, therefore, impossible, if we refer to conscious processes between conscious elements, to explain the development of thought by association. But if we substitute brain-processes and external stimuli, the theory becomes intelligible. Every sequence of *a* and *b*, however complicated with other elements, and however indistinguishable for consciousness, must, according to mechanical law, be registered in the brain. Each later complex stimulus containing the sequence of *a* and *b* serves to reinforce its registration, though the sequence still be for consciousness indistinguishable from the other elements—just as the common elements are emphasized in a composite photograph. It is inevitable, therefore, that the connections in the brain shall eventually represent, according to their relative indissolubility, the

frequency of the corresponding connections in the previous order of sense-stimuli.

How far is the position here outlined actually taken by the associational writers? It is not, so far as I know, anywhere distinctly avowed. The cause of this is easily understood if we grant, as I have tried to prove, that the distinction between the order of stimuli and the order of consciousness is the product of the recent elaboration of the conception of attention. Only one or two of the most recent associational writers have attempted to deal with that conception. For the general history of associational theory the question here discussed is one that never arose.

Nevertheless, it seems to me easy to show that the theory of association was from the outset a distinctly physiological theory, and that its recent developments have tended more positively in that direction. Germs of the physiological conception already appear in Locke. In his chapter on the association of ideas, he attributes the "wrong connexions of ideas" to "custom," which "settles habits of thinking in the understanding, as well as of determining in the will, and of motions in the body; all which seems to be but trains of motion in the animal spirits, which, once set agoing, continue in the same steps they have been used to, which, by often treading, are worn into a smooth path, and the motion in it becomes easy, and, as it were natural."¹ Locke, to be sure, is referring here merely to "wrong connexions," though he conceives his explanation to be a possible one for all trains of ideas. The theory of association begins properly with Hartley. No one who reads the *Observations on Man* can escape the conviction that he is attempting to establish a physiological and mechanical hypothesis as the explanation of mental life. "One may expect," he says,² "that *vibrations* should infer *association* as their effect, and *association* points to *vibrations* as its cause. I will endeavor, in the present chapter, to trace out this mutual relation." And though in later passages³ he tends to speak of a paral-

¹ *Essay Concerning Human Understanding*, Fraser's Ed., Vol. I, p. 529.

² *Fourth Edition*, 1801, p. 6.

³ *Ibid.*, pp. 33, 34, 72.

lelism of vibrations and associations, rather than of a causal relation between them, what he clearly has in mind is not the abandonment of the mechanical hypothesis, but the distinction between the hypothetical character of the causal relations and the actuality of a correspondence of some kind. Hartley's treatment of the subject comes much nearer to that of the most recent writers, such as Münsterberg and Ziehen, than that of any that intervene. Hume, James Mill, J. S. Mill, and Bain offer little ground, I admit, for the physiological interpretation. Bain, to be sure, thinks it needful to preface his *Senses and Intellect* with an account of the nervous system, but his method and general vocabulary is predominantly psychological. But in J. S. Mill some physiological bias is evident. In his review of Bain¹ he states that one of the latter's most important advances upon the work of his predecessors in the '*a posteriori*' school is his use and command of the facts of physiology. In the same paper² Mill, while denying that the association-theory is materialistic "in the obnoxious sense," nevertheless admits that it is more materialistic than the opposite theory, and justifies Brown in calling it a physical theory. Priestly had also, in his work on Hartley, called it a mechanical theory; and popular thought has always conceived of it as a mechanical view, using the term, however, in the merely metaphorical sense to mean that the mind acts like a machine, that is, with the regularity of a machine. What I am here trying to prove is that the theory is literally mechanical, that it attributes mental development to the purely mechanical operation of the brain set up by the action of external mechanical forces. Mill, indeed, to avoid the imputation of "obnoxious materialism" cites Berkeley's idealism as a phase of associational theory. And no doubt Berkeley was a factor in the development of associational theory, but hardly because he was idealistic. I regret that want of space prevents an interpretation of Berkeley, with proper references to chapter and verse; but no one, I think, who reads Berkeley can fail to notice the difference in tone and purpose between him and either Mill or Hume. Berkeley's insistence

¹ *Dissertations and Discussions*, Vol. IV, p. 120.

² *Ibid.*, p. 113.

upon the sole reality of ideas was directed mainly to the destruction of that inert thing called matter, hence to the strengthening of the belief in the reality of the soul and God. Mill, on the contrary, is anxious to get rid of the soul or ego ; but with matter he is at least patient.

Mr. Spencer's contribution to associational theory marks not only a great advance upon Mill and Bain, but an advance in the direction which the theory has subsequently maintained. And the view taken by him of mental development is distinctly physiological, mechanical, and materialistic. Mr. Spencer, it is true, refuses to be called a materialist. The antithesis of subject and object, or of mind and matter, he tells us, is not to be transcended. Each can be understood as conditioning the other, and what their actual relations are could only be disclosed by a view of that ultimate reality the knowledge of which is forever beyond our reach.¹ But, in the meantime, he has already told us something of their relations in the statement² that the "outer relations" *produce* the "inner relations." And a careful reading shows that this is no chance remark, but a statement of the method underlying his whole theory of development. The primary fact is the existence of "persistent outer relations," which, in the course of human development, reproduce themselves in the form of "established inner relations." The medium and final explanation of this process lies in the brain, which is the "organized register of infinitely-numerous experiences received during life."³

If the brain is the register of experience, then the experience registered must be the order of external stimuli, rather than the conscious order. But I find no statement to this effect, and the question is in fact one that never comes up. Attention has not yet entered as a factor into Mr. Spencer's psychology. We may infer his position, however, from his other statements. His identification of experience of "outer relations" and "environment" seems to show that what he means by experience is the order of sense-stimuli. For even if we could stretch the meaning of

¹ *Principles of Psychology*, 3d ed., Vol. I, p. 627.

² *Ibid.*, p. 419.

³ *Ibid.*, p. 470.

“outer relations” so far as to make it indicate merely relations between sensations, we could hardly do the same with “environment.” And that the outer relations are properties of the external objects is further shown by the summary of the knowledge-process in the *Ethics*.¹

That Mr. Spencer's psychology takes the direction here outlined as that of the association-theory, is still more decisively shown in his estimate of natural selection as a factor in the genesis of mind. In assuming that the mechanical theory guarantees that the brain-development will accurately represent the environment, I have also assumed that the brain is subject to no other influences than those of the sense-stimuli. But, of course, the contrary is possible. Brain-development may, as Professor James suggests,² be due either to the ‘front-door’ influences of experience, or to ‘back-door’ influences which act on the brain directly without the medium of nerves and end-organs. Direct influences of this kind may cause the growth of the normal brain just as a tumor causes abnormalities. The conceptions of space and cause may be due to ‘molecular accidents,’ and the correspondence of organism and environment may be due to natural selection. But natural selection cannot be depended upon for a complete correspondence of outer and inner relations. It can at best only eliminate those inner relations whose existence is disadvantageous to the organism—and only so far as they are disadvantageous. It cannot affect those that are neutral. The artistic conceptions may, for aught we know, have no relation to the struggle for existence; and the conceptions of space and cause may be useful and workable in practical life without by any means furnishing a true picture of environment. It is interesting to note, therefore, that Mr. Spencer gives to natural selection a merely subordinate place in mental development.³ The brain-structure is, according to him, due mainly to the inheritance of acquired characteristics, that is, to the inherited experience of individuals. It has, therefore, no modes of operation except those

¹ *Data of Ethics*, Ch. VII, §§41 and 47.

² *Psychology*, Vol. II, p. 627.

³ *Ibid.*, Vol. I, p. 615.

which have been given it by experience, *i. e.*, by the environment, and this serves as a guarantee that it will continue accurately to register the changes in environment.

The most modern representatives of the school are Ziehen and Münsterberg. Ziehen adopts, as a practical working basis for physiological psychology, the conception of a parallelism of material and psychical processes, at least in the case of those processes with which physiological psychology as such is concerned. According to this conception, each side is equally the conditioned and the conditioning, the determining and the determined.¹ We should expect, therefore, that each would receive equal attention. Even a physiological psychology ought to be interested in the expression of psychical laws in psychical terms. If there are any really psychical laws determining the succession of psychical states, their determination is highly important from any point of view. But Ziehen's method of procedure seems to argue that there are no mental laws. One will look in vain, in his treatment of association,² for any explanation on the mental side, such as, for instance, Mr. Bradley attempts in his *Logic*. The connections between sensations and ideas are explained by the connections in the brain—where all the real work is done.

Ziehen's conception of a 'sensation' appears in his treatment of attention. The latter is the result of a contest between competing sensations,³ depending upon their relative intensity and distinctness, and the condition of the latent ideas, which, by the way, are "deposited in ganglion cells."⁴ Here is one case of attention⁵:—"While we are taking a walk numberless visual sensations constantly throng our consciousness. If the idea of meeting other strollers, for example, is in condition to be easily reproduced, the visual sensation of an approaching friend or stranger attracts our attention, and determines our further movements and ideas; but if this idea is checked by the predominance of other thoughts, we pass the approaching person in a state of

¹ *Introduction to Physiological Psychology*, p. 2 (English translation).

² *Ibid.*, Chapters IX and X.

³ *Ibid.*, p. 207.

⁴ *Ibid.*, pp. 172, 173.

⁵ *Ibid.*, p. 211.

absent-mindedness without heeding him." Now, it should be remembered that this is not an isolated case, but a type of what happens at every instance of our waking lives. We are always 'absent-minded' to by far the greater number of the sense-stimuli. What becomes of the unnoticed stimuli? Are they represented by 'unconscious sensations,' or do they remain merely physiological excitations? Ziehen has answered the question himself by a previous reference to the same illustration:¹ "When the friend passed, the retina and optic nerve were irritated, and the latter conducted the excitation further to the occipital lobe of the cerebrum, the so-called visual center." But this is all—unless at a later moment it occurs to me that I have passed the friend, when "for the first time a concomitant psychical process appears in response to the material excitation of the occipital lobe." Now, since this is one of the sensations competing for attention, it must define the status of the other competitors at the stage of competition. That which constitutes the order of experience and "determines the subsequent course of ideation," is, therefore, in its final analysis, the competition, not of sensations, but of the physiological excitations representing the sense-stimuli.

As a final evidence of the tendency of associational theory, let me translate, without comment, the following from Münsterberg.² In support of the hypothesis that the psychical order is determined wholly by the physical order, he says: "We said first that the phenomena of external experience, as empirically presented, form a closed series conforming to the law of cause and effect; that, on the other hand, there are frequent breaks in the psychical order, and that, even where the terms are in immediate succession, there is, in spite of a certain regularity, no absolute conformity to law. An order of psychical cause and effect is therefore not empirically given. Both facts are most simply expressed by the hypothesis selected. Matter with its unchangeable laws is permanent. Its operations must therefore form a continuous, determinable series. Mental phenomena occur only in the presence of certain material conditions, that is

¹ *Ibid.*, p. 4.

² *Die Willenshandlung*, p. 109.

to say, only where certain material phenomena occur do we find the phenomena of consciousness—and then only in the order determined by the physical laws. This explains why the psychical phenomena are not continuous, why they form no causal order, and why, nevertheless, they are not wholly without order. Their regularity is not only not the result of psychical law, but is positively determined by the law governing the concomitant physical phenomena.”

Two tendencies have been curiously interwoven in the history of associational theory, the one represented by the idealism of Berkeley, and the other by the physiological bias of Hartley. The combination of the two is found in the work of Hume, the two Mills, and Bain. It is this combination of tendency which leads associationists to speak of their data as ideas, while treating them as mechanical things. It is this too which gives them the conviction, nowhere so firm as among associationists, that their data are the facts of immediate experience, and, therefore, safer than the ‘metaphysics’ of their opponents. It is this conviction which I have here sought to disturb by showing that the associational theory, in its definition of facts, as well as in its statement of laws, presupposes the mechanical as distinct from the teleological theory of the universe.

The facts upon which the associative process rests, the original elements whose relations once set up tend to persist, cannot be found in conscious experience. Impartial introspection yields us no order of sensations. The order which the associationist assumes is not an observed order but an inferred order; the presupposition underlying the inference is that the human being is subject to mechanical and physiological law. Granted that the mechanical connections between eye and brain are unbroken, every object in the field of vision must cast its image upon the retina, and the excitation there aroused must be transferred to the brain, and have its share in determining the future of the organism—whether consciously apprehended or not. This is the ground of its definition as a fact of experience—not because it is immediately apprehended as such, but because it necessarily follows from the mechanical conditions assumed to exist. The associational

'fact' presupposes, therefore, the mechanical *theory*. Associationists themselves have frankly implied that their law of combination was a physiological law, but they have continued to speak of the data combined as psychical data. This reminds one of Clifford's simile likening the conception of consciousness, as intervening in physiological processes, to a train of cars held together in the middle by the feelings of amity between the stoker and guard. Associationists simply reverse the situation, and give us trains of ideas joined by iron coupling-bars. Physiological links cannot bind together psychical states. If associationists are still to retain physiological bonds between elements—and this seems to be their destiny—they must in consistency substitute sense-stimuli in the place of sensations.

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